REMARKS

Claims 61 and 63 have been amended for greater consistency and to more clearly define embodiments of the present invention as described in the specification. Claims 61-88 are pending in the application.

Claim Objections

Applicants respectfully request reconsideration of the objection to claims 61, 62, 64 and 66-88. The Examiner asserts that claim 62 is a duplicate of claim 61. Applicants respectfully submit that claim 62 defines a related embodiment that is nevertheless distinct from claim 61 and is not duplicative.

The present invention is directed to an apparatus for evaluating catalytic performance of members of a catalyst library. The apparatus of independent claim 61 comprises a reaction vessel assembly comprising a plurality of reaction vessels, a fluid handling system for providing fluid flow simultaneously through the plurality of vessels and a detector for analyzing vessel effluent. Each of the plurality of reaction vessels is adapted for receiving catalyst library members and has an inlet and an outlet. The fluid handling system comprises an entrance control volume in fluid communication with the inlet of each of the plurality of vessels, a plurality of flow restrictors, and an exit control volume in fluid communication with the outlet of each of the plurality of vessels. Each of the plurality of flow restrictors is arranged **upstream** of one of the plurality of vessels such that each of the plurality of flow restrictors provides fluid communication between one of the plurality of vessels and the entrance control volume, and wherein maintaining a pressure in the entrance control volume higher than in the exit control volume results in fluid flow through the vessels. The flow restrictors are adapted such that the resistance to fluid flow is greatest in the flow restrictors and the resistance to fluid flow in each of the flow restrictors is

approximately the same so that fluid flow through the vessels is apportioned approximately equally between each of the plurality of vessels.

The apparatus of independent claim 62 similarly comprises a reaction vessel assembly comprising a plurality of reaction vessels adapted for receiving catalyst library members, a fluid handling system comprising a plurality of flow restrictors and a detector for analyzing vessel effluent. However, the flow restrictors of claim 62 are defined as **capillary tubes or micromachined channels** and may be placed **either upstream or downstream** of one of the plurality of vessels.

In view of the above, applicants respectfully submit that claims 61 and 62 define distinct subject matter and request that the objection to claims 61, 62, 64 and 66-88 be withdrawn.

Rejection under 35 U.S.C. §102(a)

Applicants respectfully request reconsideration of the rejection of claims 63, 70, 77 and 79-88 under 35 U.S.C. §102(a) as being anticipated by WO 98/07026 A1 (Windhab et al.). Applicants submit that the invention defined in these claims is novel and patentable over Windhab et al.

The apparatus of independent claim 63, like that defined in claim 61, comprises a reaction vessel assembly comprising a plurality of reaction vessels adapted for receiving catalyst library members and a fluid handling system for providing fluid flow simultaneously through the plurality of vessels and comprising an entrance control volume in fluid communication with the inlet of each of the plurality of vessels, a plurality of flow restrictors, and an exit control volume in fluid communication with the outlet of each of the plurality of vessels. Likewise, the flow restrictors are adapted such that the resistance to fluid flow is greatest in the flow restrictors and the resistance to fluid flow in each of the flow restrictors is approximately the same so that fluid flow through the vessels is apportioned approximately equally between each of the

plurality of vessels. However, unlike the apparatus of claim 61, the flow restrictors of claim 63 may be arranged upstream or downstream of one of the plurality of vessels such that each of the plurality of flow restrictors provides fluid communication between one of the plurality of vessels and the entrance control volume or the exit control volume. Furthermore, the apparatus of claim 63 further comprises a detector for simultaneously analyzing vessel effluents of at least two of the plurality of vessels.

Windhab et al. disclose a process and device for simultaneously investigating potentially catalytic substances in a plurality of miniaturized reactors operated in parallel. The device depicted in Figs. 1 and 2 includes reactors 2 arranged in a square or rectangular pattern in a block-shaped arrangement 3 formed by block 4, spacer plates 9 and 12 and transparent windows 13. The miniature reactors (volume 0.001 to 1 cm^3) and the supply and discharge connections for the supply of liquid and/or gaseous educts to the reactors and the removal of reaction products from the reactors are provided by bore holes in the block/plate arrangement. In the disclosed embodiment, the bore holes for the reactors are 4 mm, while the bore holes 5 for the supply of educt and the bore holes 10 for the withdrawal of product are both 2.5 mm. Fluid reactants are introduced through the bore holes 5 into contact with the catalyst 8 disposed within the reactors 2 and reaction product mixtures exit the reactors through bore holes 10 into respective cuvette bore holes 11 where the mixtures are subjected to spectroscopic analysis (e.g., IR).

The Office action asserts that the "microchannels" (10) disclosed by Windhab et al. are considered to be the same as the flow restrictors called for in the claimed apparatus and "[s]ince the microchannels (10) are the same size for each reactor, the Examiner believes that they are adapted such that resistance to fluid flow in each restrictor would be approximately the same." However, the present rejection fails to consider all of the limitations recited in claim 63, including the requirement that

the flow restrictors exert the greatest resistance to fluid flow (i.e., pressure drop) in addition to exerting approximately the same resistance to fluid flow in each of the flow restrictors such that fluid flow or flowrate through the vessels is apportioned equally between each of the plurality of vessels. An apparatus as defined in the pending claims including flow restrictors adapted to control the flowrate of a test fluid (e.g., one or more reactants) to be about the same in the vessels is a significant advantage because the extent of change in the test fluid following contact with a library member (e.g., a candidate catalyst) depends on, among other things, the time a given amount of test fluid contacts the library member.

Windhab et al. does not disclose flow restrictors that exert the greatest resistance to fluid flow and a resistance that is approximately the same in each flow restrictor. That is, the reaction mixture withdrawal drillings 10 of the device disclosed by Windhab et al. equated with the flow restrictors called for in the claimed apparatus do not satisfy these requirements of the invention. The mere disclosure that the diameter of the purported flow restrictors (i.e., withdrawal drillings 10) is smaller than the diameter of the reactors in Windhab et al.'s device does not mean that the withdrawal drillings produce a greater resistance to fluid flow than the catalyst bed. Although the calculated area within these two components perpendicular to the direction of fluid flow is approximately 5 and 13 mm^2, respectively, the **actual** fluid flow area within the reactor is significantly diminished by the presence of the catalyst bed. It is not possible to determine, nor is there any suggestion by Windhab et al. that the withdrawal drillings exert the greatest resistance to fluid flow along the flow paths between the supply drillings and the cuvette drillings so as to control the flowrate of the fluid passing through the reactors to be approximately the same as required in the claimed apparatus. In the absence of any teaching to the contrary, the fluid flow resistance in the device of Windhab may be greatest in the reactors (i.e., catalyst bed)

and could also vary significantly from one catalyst bed to the next along with the fluid flowrate.

In view of the above, applicants respectfully submit that the invention defined in independent claims 63 and in claims 70, 77, and 79-88 depending therefrom is not anticipated by the disclosure of Windhab et al.

Rejection under 35 U.S.C. §103(a)

Applicants respectfully request reconsideration of the rejection of claims 74 and 75 under 35 U.S.C. §103(a) as being unpatentable over the disclosure in Windhab et al. in view of U.S. Patent No. 4,099,923 (Milberger). Applicants submit that the invention defined in these claims is non-obvious and patentable over the cited references.

The deficiencies of the primary reference with respect to claim 63 cannot be overcome by resort to Milberger.

Milberger discloses an automatic catalyst screening unit including a reactor module 25 defining six reaction chambers for receiving candidate catalysts. In operation, a reactant feeding means 10 selectively feeds the flow of gaseous reactants to each individual reaction chamber in accordance with a predetermined time sequence using a six-way selector valve 27. The gross reaction product passing out of each of the reaction chambers passes through a common outlet manifold 106 and then into an analyzing system 114. A solenoid actuated three-way valve 120 directs the gaseous reaction product to a vent for a reasonable period of time until steady state conditions are reached in a particular vessel and then the valve 120 directs the reaction product into the analyzing system wherein a predetermined volume of gaseous product is transferred to a gas chromatograph 126 for analysis. The selector valve 27 then directs the gaseous reactants to the next in the sequence of reaction chambers and the same procedure is repeated until all six of the catalyst have been tested.

In contrast to the apparatus of claim 63 and the disclosure in Windhab et al., reactant feed is introduced into each of the reaction chambers in Milberger's device and the resulting product analyzed (i.e., detected) individually, in serial fashion, not simultaneously. Accordingly, the suggested combination of Windhab et al. and Milberger is inapposite. Moreover, Milberger does not teach or suggest how one might control the contact time to be about the same for each of the six or more candidate catalysts in a fluid handling system in which reactants simultaneously contact different candidate catalyst in different vessels and the resulting reaction product is simultaneously discharged and analyzed and certainly does not teach or suggest such a system including a plurality of flow restrictors that exert the greatest resistance to fluid flow and a resistance that is approximately the same in each flow restrictor as required by claim 63.

In view of the above, applicants submit that the Examiner has failed to establish a *prima facie* case of obviousness with respect to the invention defined in claims 74 and 75 and respectfully request withdrawal of the rejection.

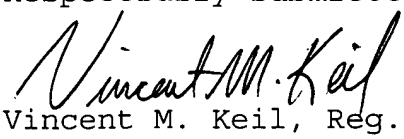
Conclusion

In view of the above, it is respectfully submitted that the pending claims are clearly patentable over the art of record.

Favorable reconsideration and allowance of all pending claims are respectfully solicited.

The Commissioner is requested to charge any fee deficiency of overpayment in connection with this amendment to Deposit Account 19-1345.

Respectfully submitted,



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